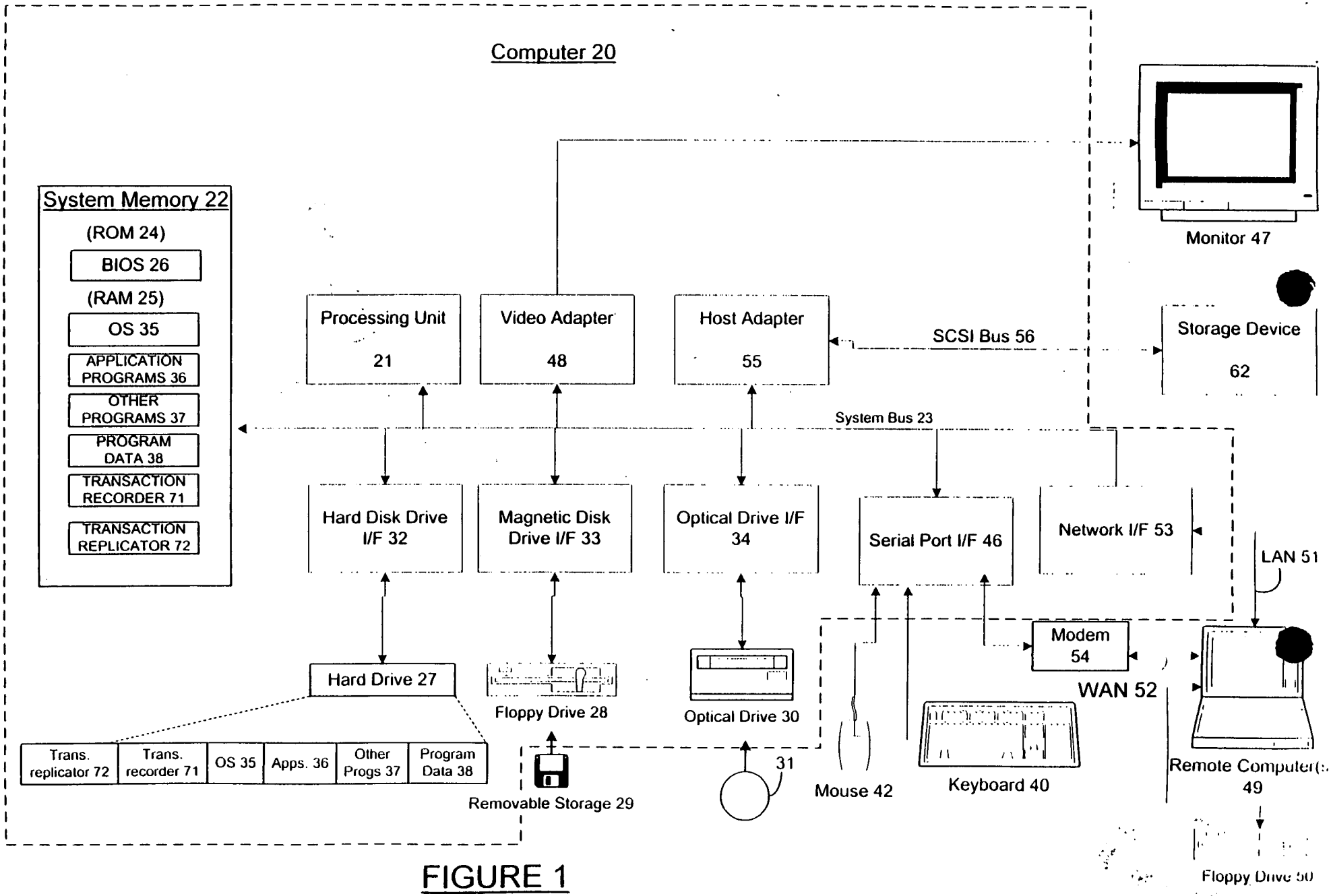
Computer 20
System Memory 22
(ROM 24)
BIOS 26
(RAM 25)
OS 35
APPLICATION PROGRAMS 36
OTHER PROGRAMS 37
PROGRAM DATA 38
TRANSACTION RECORDER 71
TRANSACTION REPLICATOR 72
Processing Unit 21
Video Adapter 48
Host Adapter 55
SCSI Bus 56
Monitor 47
Storage Device 62
System Bus 23
Hard Disk Drive I/F 32
Magnetic Disk Drive I/F 33
Optical Drive I/F 34
Serial Port I/F 46
Network I/F 53
LAN 51
Modem 54
WAN 52
Hard Drive 27
Floppy Drive 28
Optical Drive 30
Trans. replicator 72
Trans. recorder 71
OS 35
Apps. 36
Other Progs 37
Program Data 38
Removable Storage 29
31
Mouse 42
Keyboard 40
Remote Computer(s) 49
Floppy Drive 50

FIGURE 1

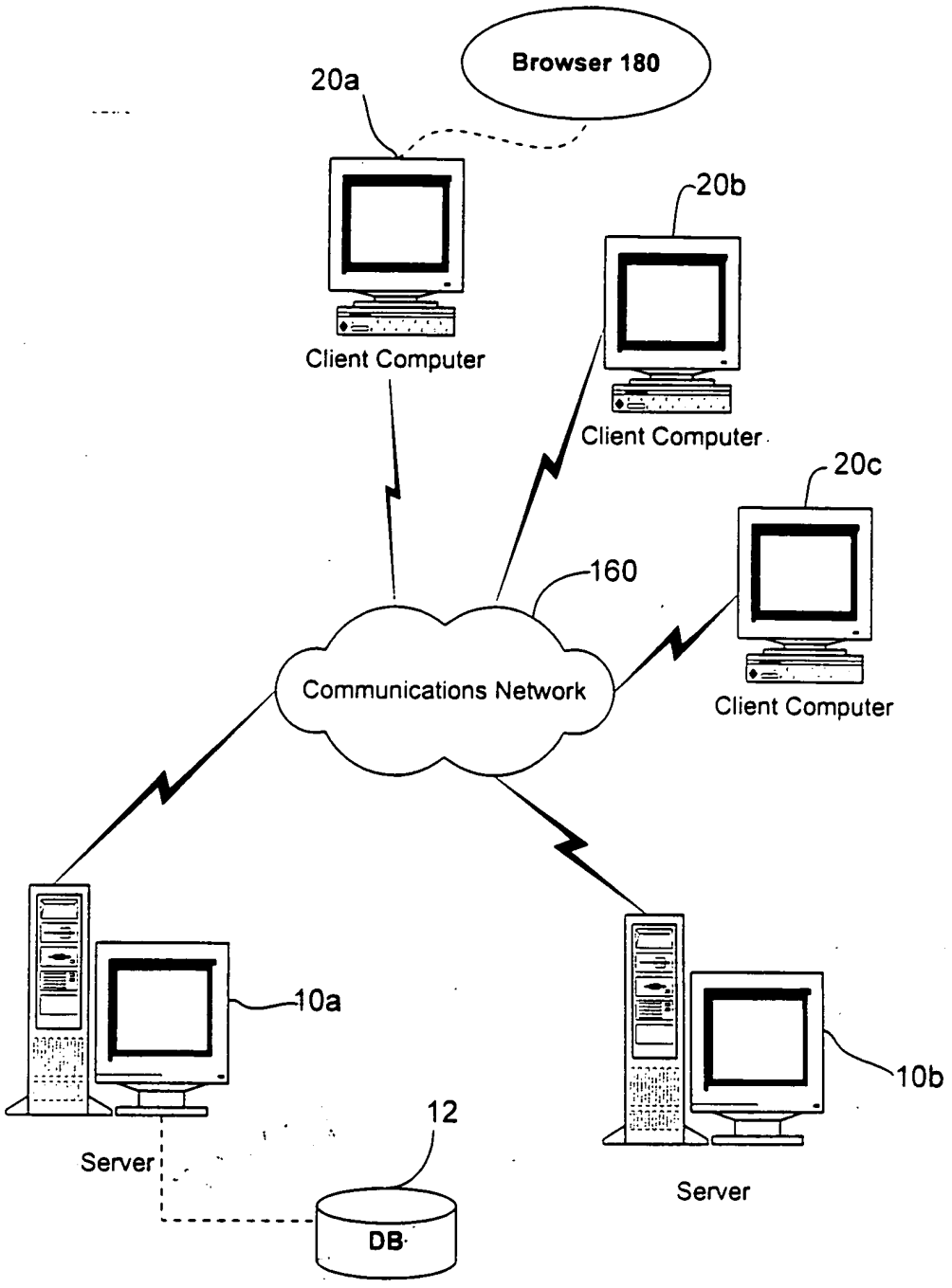
Browser 180
20a
20b
Client Computer
Client Computer
20c
160
Communications Network
Client Computer
10a
10b
12
Server
DB
Server

FIGURE 2

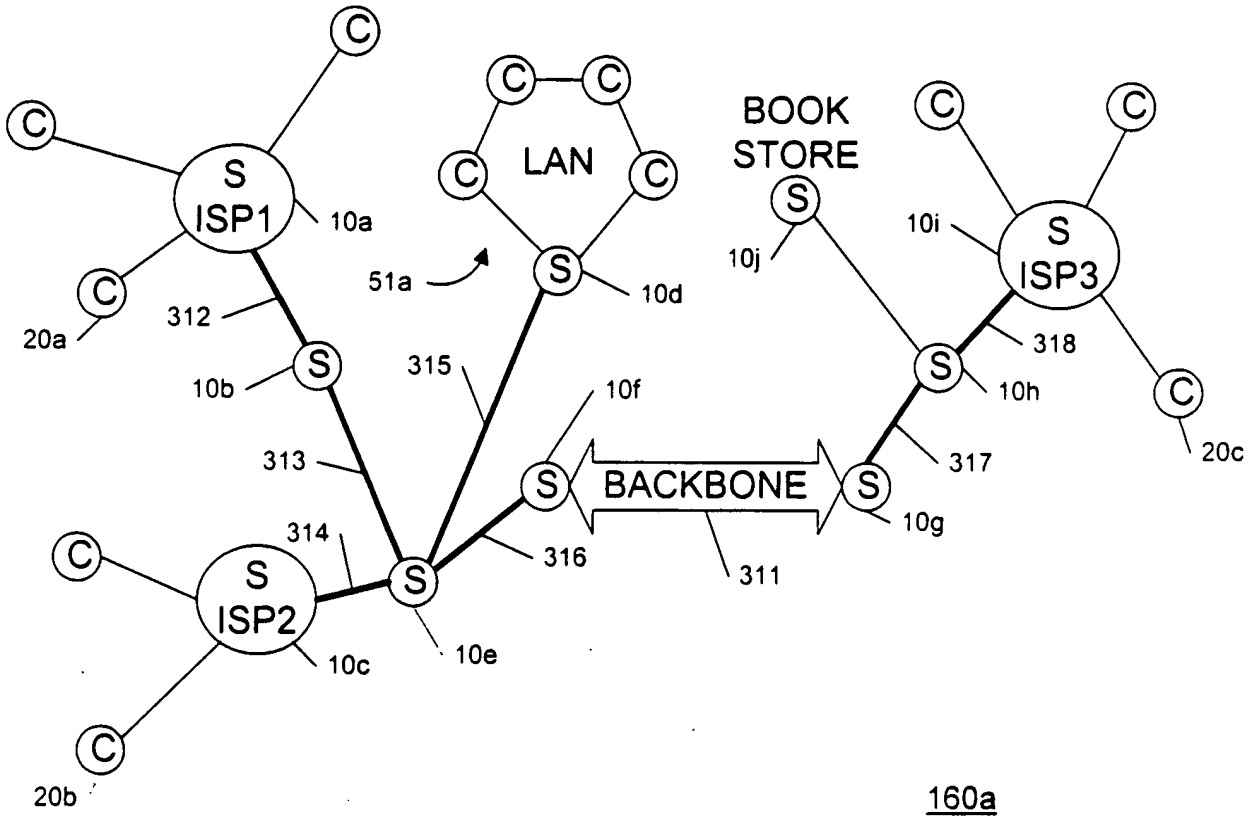
C
S
ISP1
10a
20a
312
10b
313
314
S
ISP2
10c
20b
C
LAN
51a
10d
315
S
10e
316
10f
S
BACKBONE
S
311
10g
317
BOOK
STORE
10j
10i
S
ISP3
318
10h
20c
160a

FIGURE 3

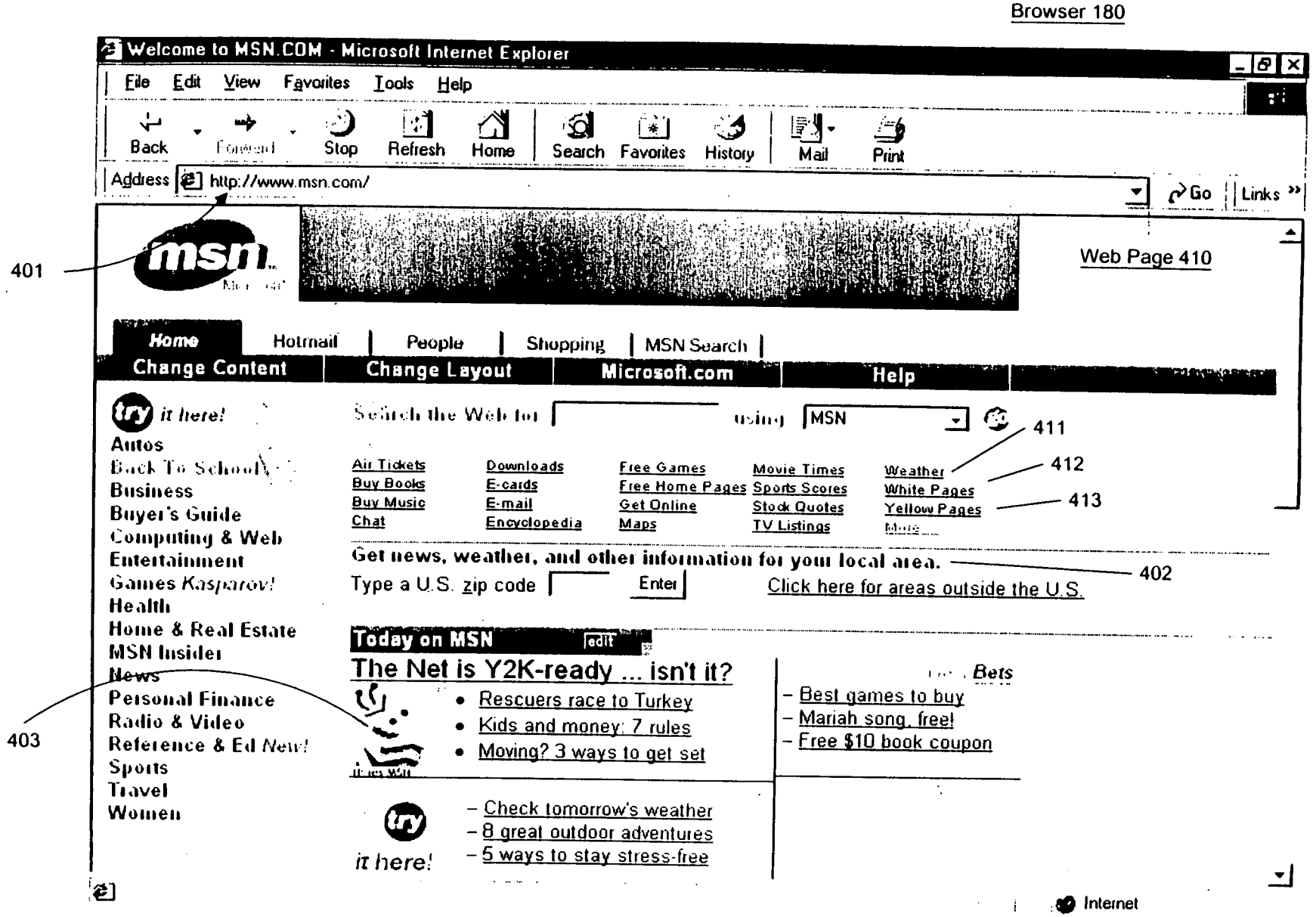
Browser 180
Welcome to MSN.COM - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Forward Stop Refresh Home Search Favorites History Mail Print
Address http://www.msn.com/
Go Links
401
Web Page 410
Home Hotmail People Shopping MSN Search
Change Content Change Layout Microsoft.com Help
try it here!
Autos
Back To School
Business
Buyer's Guide
Computing & Web
Entertainment
Games Kasparov!
Health
Home & Real Estate
MSN Insider
News
Personal Finance
Radio & Video
Reference & Ed New!
Sports
Travel
Women
403
Search the Web for using MSN
411
412
413
Air Tickets Downloads Free Games Movie Times Weather
Buy Books E-cards Free Home Pages Sports Scores White Pages
Buy Music E-mail Get Online Stock Quotes Yellow Pages
Chat Encyclopedia Maps TV Listings More
Get news, weather, and other information for your local area.
402
Type a U.S. zip code Enter Click here for areas outside the U.S.
Today on MSN edit
The Net is Y2K-ready ... isn't it?
• Rescuers race to Turkey
• Kids and money: 7 rules
• Moving? 3 ways to get set
Bets
– Best games to buy
– Mariah song, free!
– Free $10 book coupon
try it here!
– Check tomorrow's weather
– 8 great outdoor adventures
– 5 ways to stay stress-free
Internet

FIGURE 4

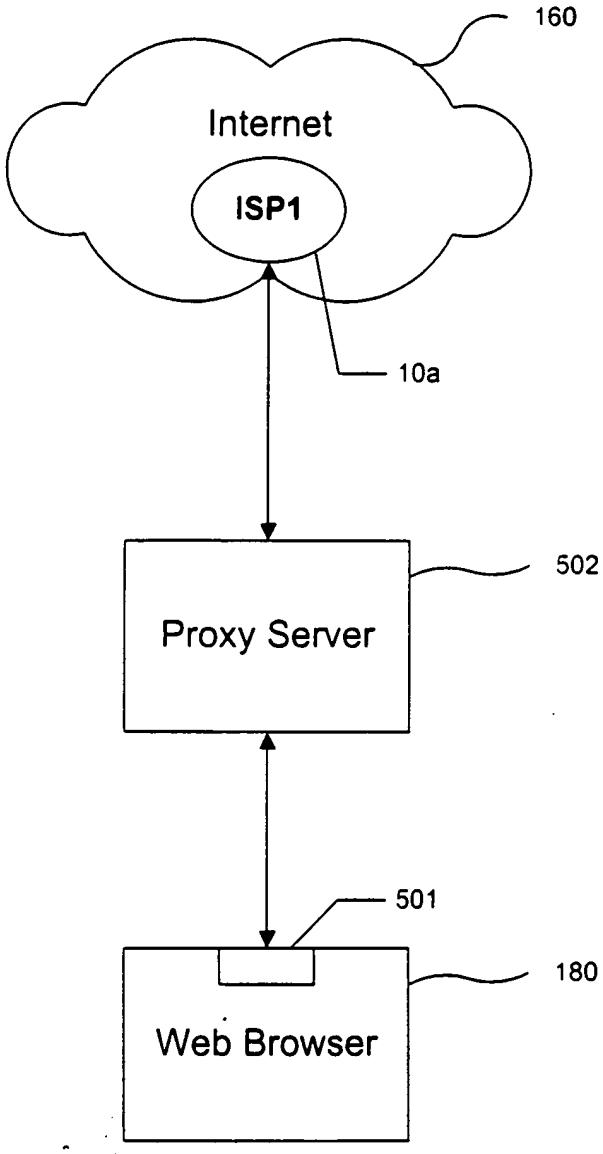

FIGURE 5

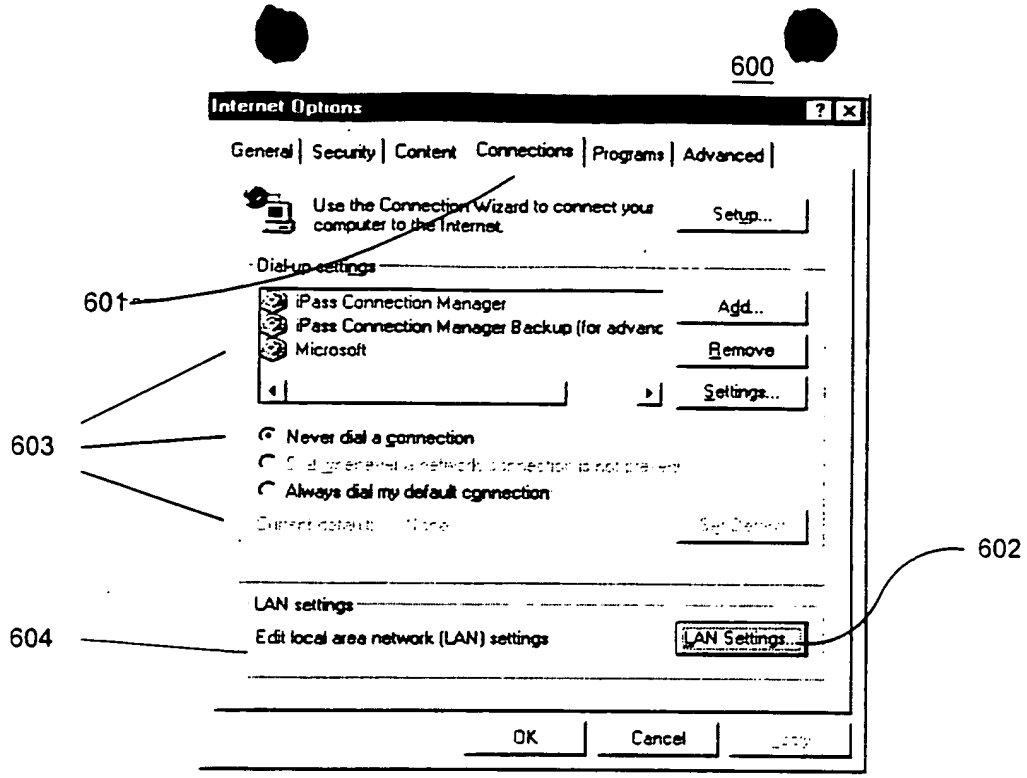

FIGURE 6

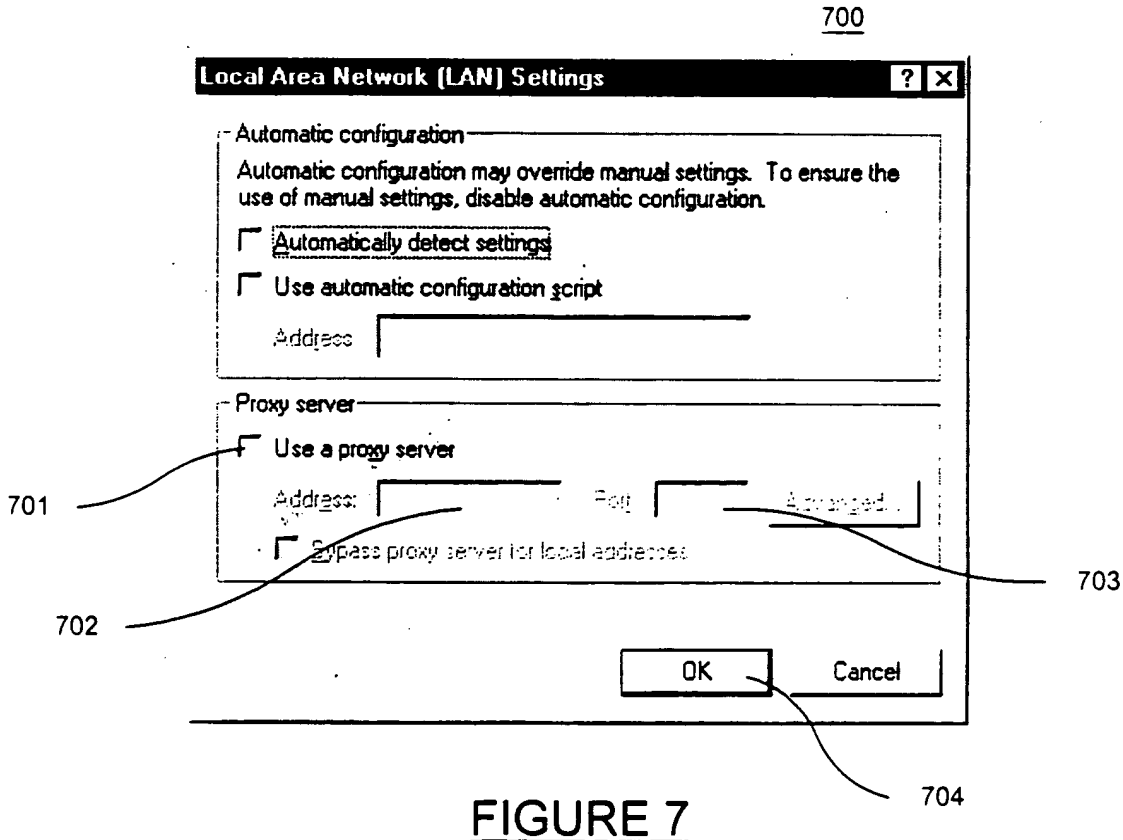

FIGURE 7

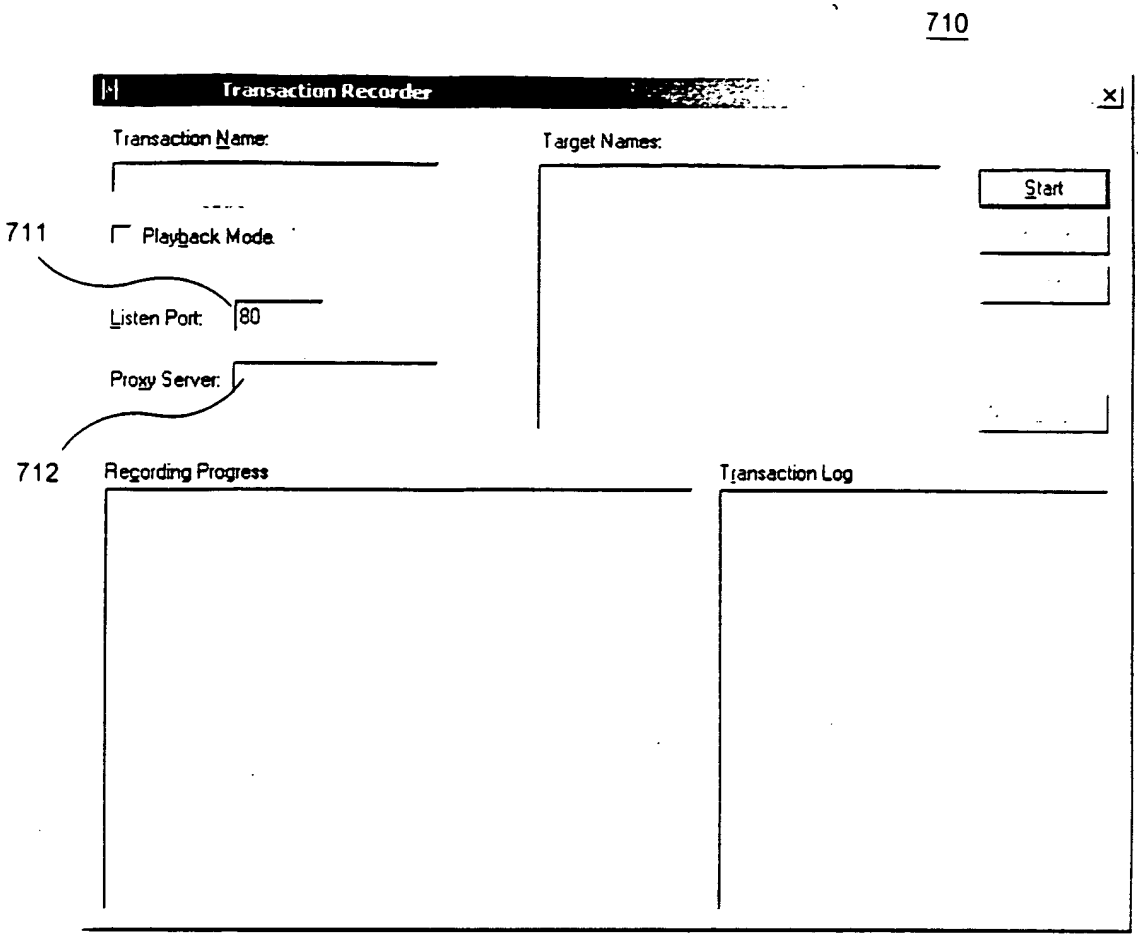

FIGURE 7A

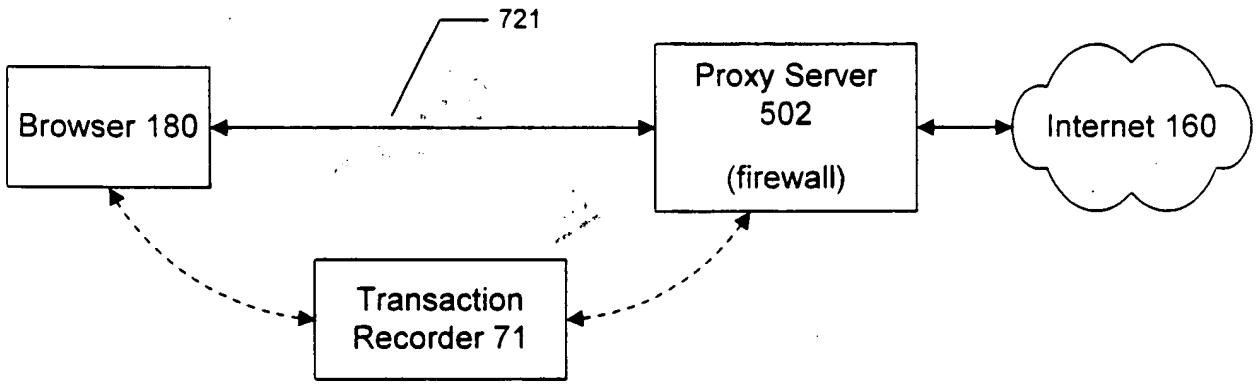

FIGURE 7B

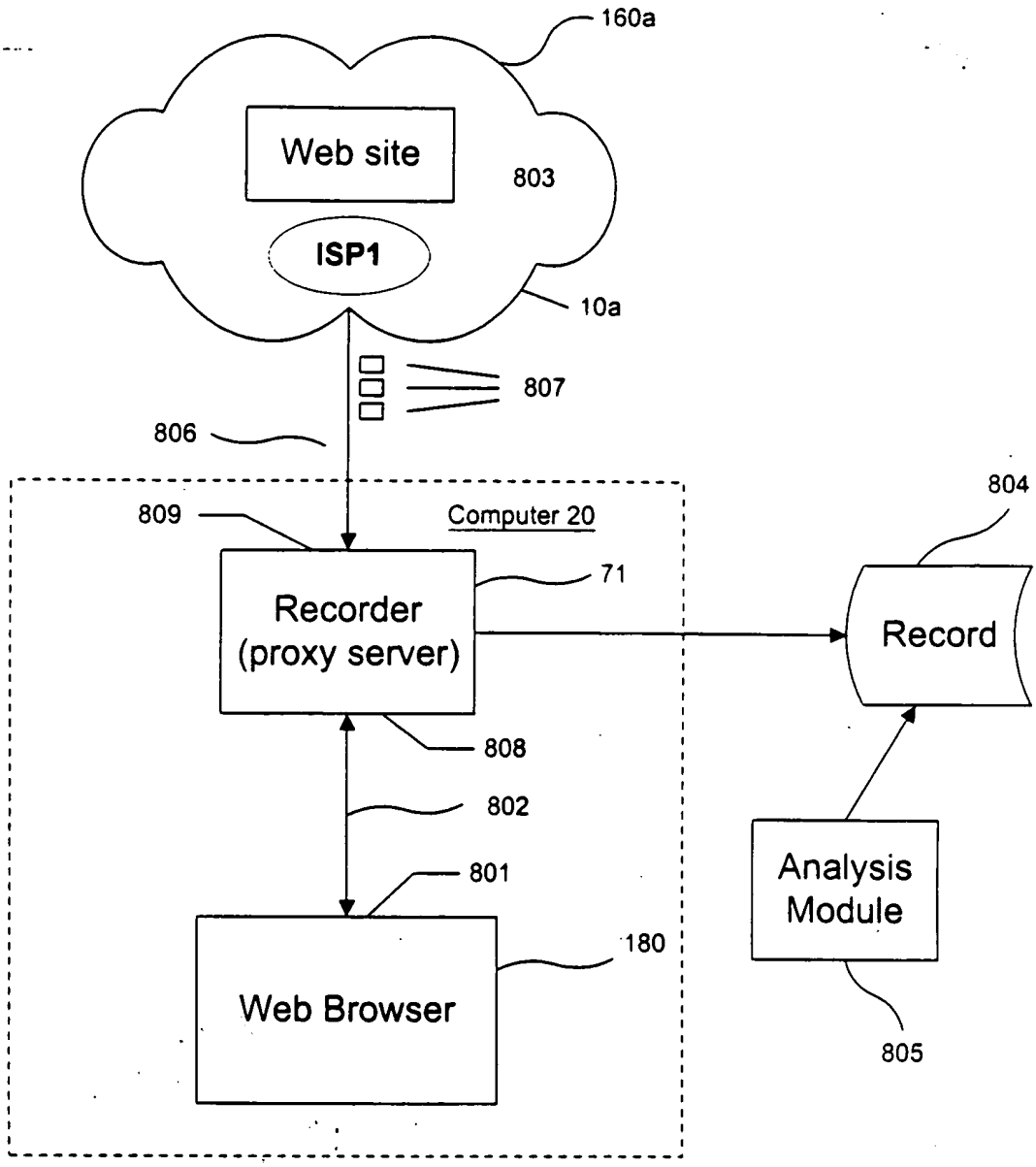
160a
Web site
803
ISP1
10a
807
806
804
809
Computer 20
71
Recorder
(proxy server)
Record
808
802
801
Analysis
Module
180
Web Browser
805

FIGURE 8

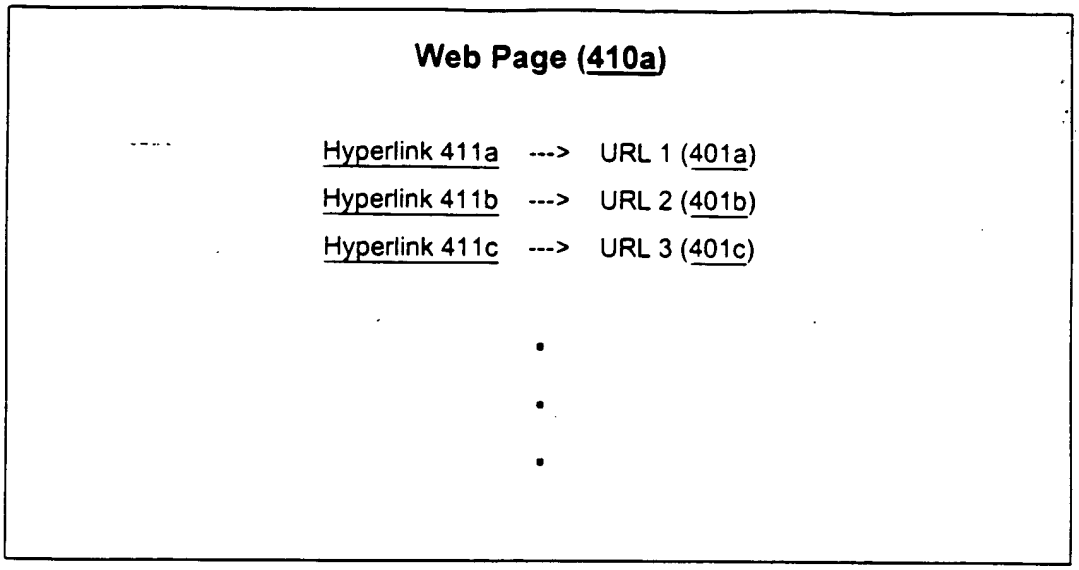

FIGURE 9

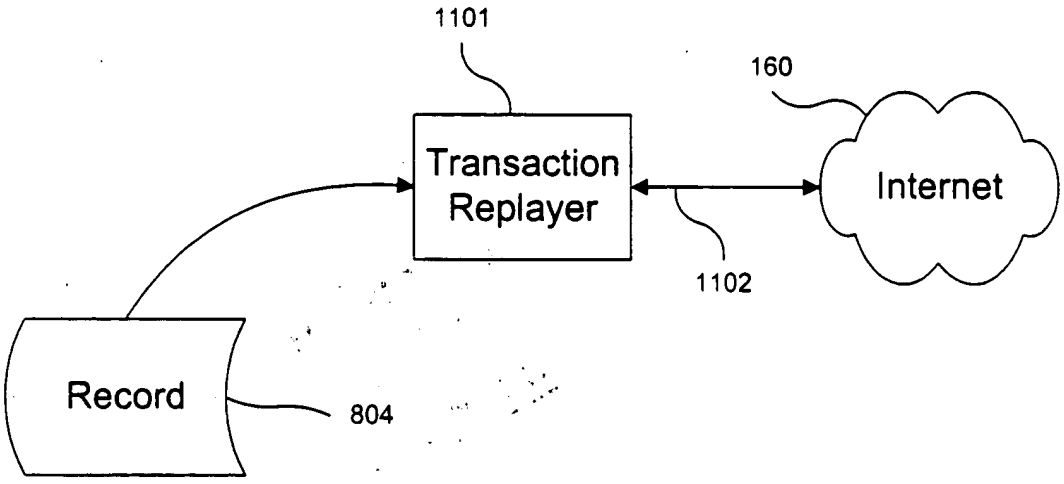

FIGURE 11

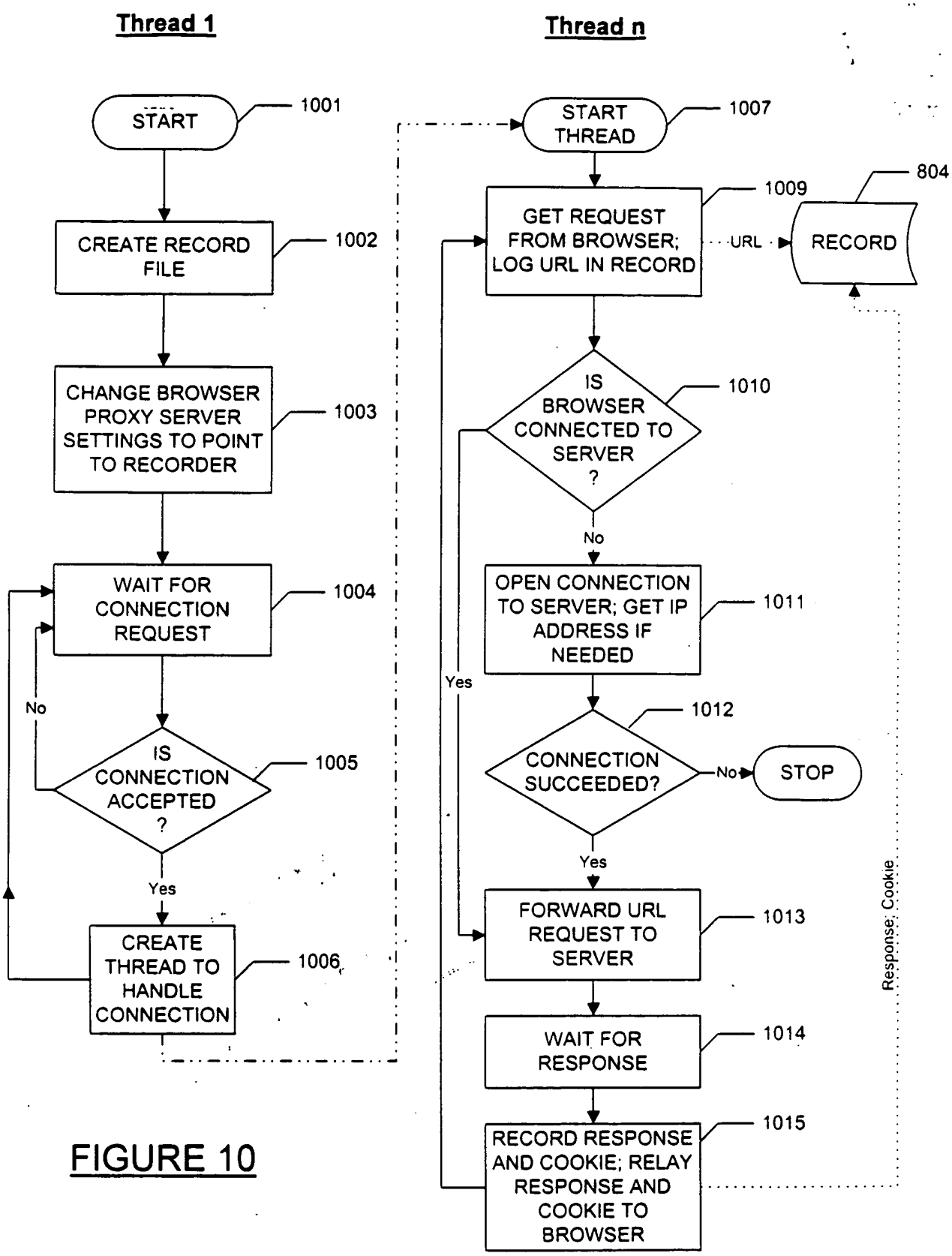
Thread 1
Thread n
START
1001
CREATE RECORD FILE
1002
CHANGE BROWSER PROXY SERVER SETTINGS TO POINT TO RECORDER
1003
WAIT FOR CONNECTION REQUEST
1004
IS CONNECTION ACCEPTED ?
1005
No
Yes
CREATE THREAD TO HANDLE CONNECTION
1006
START THREAD
1007
GET REQUEST FROM BROWSER; LOG URL IN RECORD
1009
URL
RECORD
804
IS BROWSER CONNECTED TO SERVER ?
1010
No
Yes
OPEN CONNECTION TO SERVER; GET IP ADDRESS IF NEEDED
1011
CONNECTION SUCCEEDED?
1012
No
STOP
Yes
FORWARD URL REQUEST TO SERVER
1013
WAIT FOR RESPONSE
1014
RECORD RESPONSE AND COOKIE; RELAY RESPONSE AND COOKIE TO BROWSER
1015
Response; Cookie

FIGURE 10

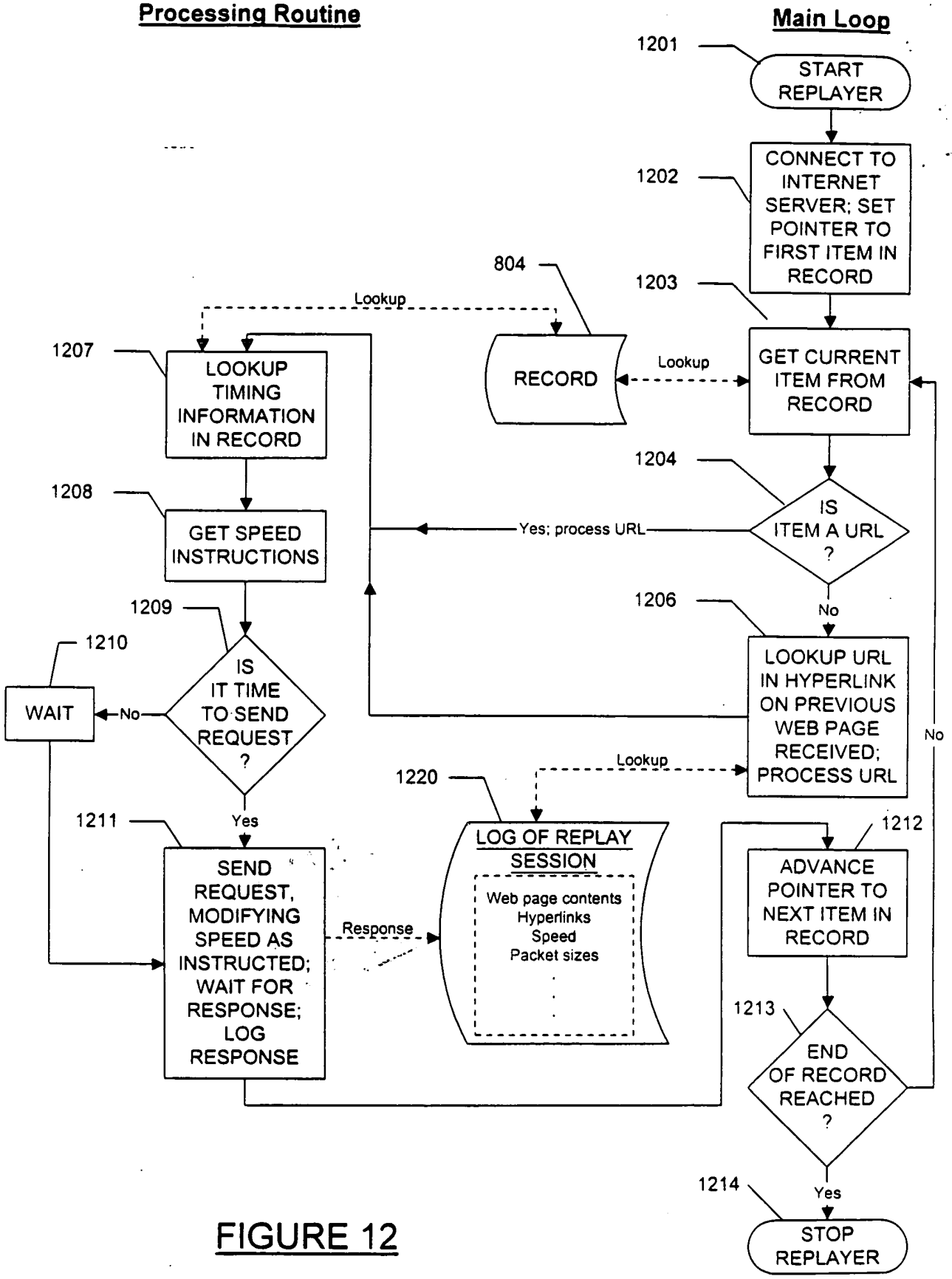
Processing Routine
Main Loop
1201
START REPLAYER
1202
CONNECT TO INTERNET SERVER; SET POINTER TO FIRST ITEM IN RECORD
804
1203
Lookup
RECORD
Lookup
GET CURRENT ITEM FROM RECORD
1207
LOOKUP TIMING INFORMATION IN RECORD
1204
IS ITEM A URL ?
1208
GET SPEED INSTRUCTIONS
Yes; process URL
1209
No
1206
1210
IS IT TIME TO SEND REQUEST ?
WAIT
No
LOOKUP URL IN HYPERLINK ON PREVIOUS WEB PAGE RECEIVED; PROCESS URL
No
Lookup
1220
Yes
1211
LOG OF REPLAY SESSION
Web page contents
Hyperlinks
Speed
Packet sizes
1212
SEND REQUEST, MODIFYING SPEED AS INSTRUCTED; WAIT FOR RESPONSE; LOG RESPONSE
Response
ADVANCE POINTER TO NEXT ITEM IN RECORD
1213
END OF RECORD REACHED ?
1214
Yes
STOP REPLAYER

FIGURE 12